REMARKS

This responds to the Office Action mailed on May 31, 2005. In this response, claim 1 is amended. No claims are added or canceled. As a result, claims 1-27 and 32-35 are now pending in this application. Reconsideration of this application is requested in view of the above amendment and the below remarks.

Objection of the Claims

Objection: In the Office Action mailed May 31, 2005, the Examiner objected to Claim 1 because of the following informalities: The limitations as recited in claim 1, line 10 include "the second height greater than the first height". However, see described in the specification (see Fig. 2, p66), the h2 is smaller than h1.

Response: Applicant feels that there is no basis for the objection. There is no requirement that the heights as set forth in the specification as h_1, h_2, and h_3, correspond to the first, second and third heights set forth in the claim.

In addition, even though the claim indicates that the second height is greater than the first height, the two heights set forth in the claim refer to the height of the sacrificial component and the height of the component, respectively. The dimension h_1 is the height of the solder balls (see page 6, line 10, and FIG. 2 of the instant application). The solder balls are not recited as elements in claim 1. Neither is the height of the solder balls. The dimension h_2 (as set forth in the specification) is the height of the sacrificial component and the dimension h_3 (as set forth in the specification) is the height of the component near the sacrificial component (see page 6, lines 10-13, and FIG. 2 of the instant application). Therefore, the height h_2 corresponds to the second height set forth in the specification. If there is a requirement that the heights set forth in the specification must match the heights as set forth in the claim, then the drawings and sepcification will have to be amended to reflect this. The only other way would be to amend the claim to discuss a second and third height. Amending the claim in this way would be objected to since there would be no discussion of a first height. Set forth below is claim 1 with the corresponding reference numbers from the specification placed in the claim.

IN THE DRAWINGS

The formalized drawings submitted herewith overcome the Examiner's objection under 37 C.F.R. 1.121(d) since the reference numerals are clear and legible.

Claim 1 recites "...at least one component attached to at least some of the plurality of lands on the first major surface, the at least one component having a first height (h_3) with respect to the first major surface; and at least one sacrificial component attached to the first major surface, the at least one sacrificial component having a second height (h_2) with respect to the first major surface, the second height (h_2) greater than the first height (h_3), the at least one sacrificial component further including a fuse." (The various heights have been added in the claim)

§103 Rejection of the Claims

A. Rejection: Claims 1-7, 11-14, and 16 were rejected under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S. 5,798,567) in view of Miyazawa (U.S. 2002/0182842).

B. Response: In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference or references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)).

Claim 1 recites "...at least one component attached to at least some of the plurality of lands on the first major surface, the at least one component having a first height with respect to the first major surface; and at least one sacrificial component attached to the first major surface, the at least one sacrificial component having a second height with respect to the first major surface, the second height greater than the first height, the at least one sacrificial component further including a fuse." By Examiner's own admission, the Kelly et al. device fails to teach a sacrificial component. The Examiner points to elements 30 and 32 of the Miyazawa reference as teaching the sacrificial component. Element 30 is solder (see first line of paragraph 80 of he

Miyazawa reference). Element 32 refers to connection sections "...formed between external terminals (leads, for example) of the first electronic parts 20 and 22 and the interconnect patterns 16, though which the external terminals and the interconnect patterns 16 are electrically connected..." (See paragraph 80 of the Miyazawa reference). Thus, there appears to be no teaching of a sacrificial component, much less a sacrificial component with a fuse, as suggested by the Examiner. In fact, an electronic search of the Miyazawa document on the uspto.gov website reveals no use of the word sacrificial or sacrifice. The only mention of a fuse is specifically for use an electrical component 20 or 22 (see paragraph 79 of Miyazawa). By the Examiner's own admission, the Kelly et al. reference fails to teach a sacrificial component. The Miyazawa reference also fails to teach a sacrificial component. Therefore, the combination of Kelly et al. and the Miyazawa reference fail to teach the sacrificial component. A proper *prima facie* case is not made out since the prior art references fail to teach or suggest all the claim limitations.

Additionally, a prima facie case of obviousness requires some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. The Examiner indicates that it would be obvious to take a fuse and substitute it in for a solderball electrical connection in Kelly et al. to yield applicant's invention as claimed. This would destroy the Kelly et al. reference. Replacing the electrical connection (solderball of Kelly et al.) with a fuse would produce an open prematurely. A signal or power would not flow to the chip resulting in a failure. In addition, the difficulty in attaching the ball grid array to the substrate would be increased dramatically. Now, not only do all the balls of the ball grid array have to connect to the corresponding pads, but a fuse with a variable height must also be attached. Simply put, the increased difficulty in manufacturing such a device along with the fact that such an arrangment would destroy the reference is evidence away from a suggestion or motivation to combine as suggested by the Examiner. For each of the above reasons, claim 1 overcomes the Examiner's rejection under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S. 5,798,567) in view of Miyazawa (U.S. 2002/0182842).

Claims 2-7 depend from claim 1 and include the limitations of claim 1 by their dependency. As a result, claims 2-7 also overcome the rejection under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S. 5,798,567) in view of Miyazawa (U.S. 2002/0182842).

Claim 11 recites "...an array of solder balls attached to a first portion of the array of lands; at least one discrete component attached to a second portion of the array of lands; and at least one sacrificial component attached to a third portion of the array of lands, the sacrificial component having a fuse therein." By Examiner's own admission, the Kelly et al. device fails to teach a sacrificial component. The Examiner points to elements 30 and 32 of the Miyazawa reference as teaching the sacrificial component. Element 30 is solder (see first line of paragraph 80 of he Miyazawa reference). Element 32 refers to connection sections "...formed between external terminals (leads, for example) of the first electronic parts 20 and 22 and the interconnect patterns 16, though which the external terminals and the interconnect patterns 16 are electrically connected..." (See paragraph 80 of the Miyazawa reference). Thus, the Miyazawa et al. reference does not appear to teach a sacrificial component, much less a sacrificial component with a fuse, as suggested by the Examiner. As pointed out above, an electronic search of the Miyazawa document on the uspto.gov website reveals no use of the word sacrificial or sacrifice. The only mention of a fuse is specifically for use an electrical component 20 or 22 (see paragraph 79 of Miyazawa). Since neither the Kelly et al. (as admitted by the Examiner) nor the Miyazawa reference teach a sacrificial component, the combination of these references fail to teach or suggest the sacrificial component. A proper *prima facie* case is not made out since the prior art references fail to teach or suggest all the claim limitations.

Additionally, a prima facie case of obviousness requires some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. The Examiner indicates that it would be obvious to take a fuse and substitute it in for a solderball electrical connection in Kelly et al. to yield applicant's invention as claimed. However, this would destroy the Kelly et al. reference. Replacing the electrical connection (solderball of Kelly et al.) with a fuse would produce an open prematurely, and would also increase the difficulty of manufacture. The destruction of the reference is evidence contradicting a suggestion or motivation to combine as suggested by the Examiner. For each of the above reasons, claim 11 also overcomes the

Examiner's rejection under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S. 5,798,567) in view of Miyazawa (U.S. 2002/0182842).

Claims 12-14, and 16 depend from claim 11 and include the limitations of claim 11 by their dependency. As a result, claims 12-14, and 16 also overcome the rejection under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S. 5,798,567) in view of Miyazawa (U.S. 2002/0182842).

C. Rejection: Claims 8-10, 17-20, 32-33, and 35 were rejected under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S. 5,798,567) and Miyazawa (U.S. 2002/0182842) as applied to claims 1-7 above, and further in view of Hatagishi (U.S. 4,869,972). The Examiner contends that Kelly et al. and Miyazawa teach substantially the entire method as applied to claims 8-10 and 17-20 and the Hatagishi reference teaches the fuse.

D. Response: With respect to claims 8-10, the Examiner contends that the combination of references teaches the method of these claims. Claims 8-10 are not method claims, but are apparatus claims. This response addresses the rejection in terms of an apparatus. Claims 8-10 depend from claim 1, either directly or indirectly, and include the limitations of claim 1 by their dependency. As pointed out above, claim 1 recites "...at least one component attached to at least some of the plurality of lands on the first major surface, the at least one component having a first height with respect to the first major surface; and at least one sacrificial component attached to the first major surface, the at least one sacrificial component having a second height with respect to the first major surface, the second height greater than the first height, the at least one sacrificial component further including a fuse." By Examiner's own admission, the Kelly et al. device fails to teach a sacrificial component. As also pointed out above the Miyazawa reference also fails to teach a sacrificial component. The Hataghishi reference also fails to teach the use of a sacrificial component that includes a fuse. As a result, the combination of Kelly et al., Miyazawa, and Hatagishi fails to teach or suggest a sacrificial component, much less a sacrificial component with a fuse.

In addition, combining these references as suggested by the Examiner destroys the Kelly reference since replacing a solderball with a fuse will result in premature failure of the electronic

device of Kelly et al. and will also increase the complexity of manufacture. Accordingly, claims 8-10 overcome the rejection under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S. 5,798,567) and Miyazawa (U.S. 2002/0182842) as applied to claims 1-7 above, and further in view of Hatagishi (U.S. 4,869,972).

With respect to claims 17-20, the Examiner contends that the combination of references teaches the method of these claims. Claims 17-20 are not method claims, but are apparatus claims. This response addresses the rejection in terms of an apparatus. Claims 17-20 depend from claim 11, either directly or indirectly, and include the limitations of claim 11 by their dependency. As pointed out above, claim 11 recites "...an array of solder balls attached to a first portion of the array of lands; at least one discrete component attached to a second portion of the array of lands; and at least one sacrificial component attached to a third portion of the array of lands, the sacrificial component having a fuse therein." By Examiner's own admission, the Kelly et al. device fails to teach a sacrificial component. As also pointed out above the Miyazawa reference also fails to teach a sacrificial component. The Hataghishi reference also fails to teach the use of a sacrificial component that includes a fuse. As a result, the combination of Kelly et al., Miyazawa, and Hatagishi fails to teach or suggest a sacrificial component, much less a sacrificial component with a fuse.

In addition, combining these references as suggested by the Examiner destroys the Kelly reference since replacing a solderball with a fuse will result in premature failure of the electronic device of Kelly et al. and will also increase the complexity of manufacture. Accordingly, claims 17-20 overcome the rejection under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S. 5,798,567) and Miyazawa (U.S. 2002/0182842) as applied to claims 1-7 above, and further in view of Hatagishi (U.S. 4,869,972).

Claim 32 recites "...a block of substantially nonconductive material further including: a first major surface; a second major surface; one of the first major surface and the second major surface including: a first solderable surface; and a second solderable surface; and a fuse positioned between the first solderable surface and the second solderable surface.
None of the Kelly et al. reference, the Mayazawa reference, and the Hataghishi reference teach or suggest a block of substantially nonconductive material. The Hataghishi reference teaches a body of plastic which is hollow. It fails to teach or suggest a block of nonconductive material.

Accordingly, claim 32 overcomes the rejection under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S. 5,798,567) and Miyazawa (U.S. 2002/0182842) as applied to claims 1-7 above, and further in view of Hatagishi (U.S. 4,869,972) since none of the references teaches or suggests the claim limitation of a block of substantially nonconductive material. Therefore, the combination of the references simply falls short of the claimed elements.

Claims 33 and 35 depend from claim 32 and include the recitations of claim 32 by their dependency. Accordingly, claims 33 and 35 also overcome the Examiner's rejection.

E. Rejection: Claims 15, 21-27, and 34 were rejected under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S.5,798,567) and Miyazawa (U.S. 2002/0182842) as applied to claims 1-7 above, and further in view of Hatagaishi (U.S.4,869,972) and Sugita et al. (U.S.5,068,706). The Examiner contends that it would have been obvious to a person of ordinary skill in the art "...to incorporate at least one non operational SC being positioned with respect to the PCB to prevent at least one discrete component from contacting the ground and power places of the PCB as taught by Sugita et al. so that breakage of components can be prevented and electrical performance/reliablity can be improved in Miyazawa, Hatagishi and Kelly et al's device." The Examiner cites the blown fuse of Fig. 6C of Sugita et al. for support.

F. Response: Claim 15 depends from claim 11 and includes the limitations of claim 11 by its dependency. As pointed out above, the Kelly et al, the Miyazawa and the Hatagishi references do not teach a sacrificial component. The Sugita et al. reference does not cure this shortcoming. The Sugita et al. reference teaches several fuse configurations. It does not teach the use of a sacrificial component. Furthermore, to yield applicant's invention from the Miyazawa, Hatagishi and Kelly et al. device, requires a modification that destroys the Kelly et al. reference. Namely, substituting a fuse for a ball-shaped connection. The Examiner contends that it would have been obvious to a person of ordinary skill in the art "...to incorporate at least one non operational SC being positioned with respect to the PCB to prevent at least one discrete component from contacting the ground and power places of the PCB as taught by Sugita et al. so that breakage of components can be prevented and electrical performance/reliablity can be improved in Miyazawa, Hatagishi and Kelly et al's device." Applicant disagrees with the

Examiner's contention. The teaching in Sugita et al. seems to teach a different type of fuse that is incorporated within a device. In other words, the use of the fuse discussed in Sugita et al. is to prevent the loss of electronic components when current flow becomes excessive. There is no teaching of placing a blown fuse in a circuit. Furthermore, there is no suggestion of incorporating an already blown fuse in a device, as suggested by the Examiner. In fact, the use of an already blown fuse in the circuits shown, such as those shown in FIGs. 29, 31A, 31B, 32, 33, 34A, and 34B, would destroy the reference, and result in non functioning circuit. This teaches away from the Examiner's contention and is evidence against the modification suggested by the Examiner. As a result, the rejection of claim 15 under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S.5,798,567) and Miyazawa (U.S. 2002/0182842) as applied to claims 1-7 above, and further in view of Hatagaishi (U.S.4,869,972) and Sugita et al. (U.S.5,068,706) is overcome.

Claim 21 recites an assembly including "...an array of solder balls attached to a first portion of the array of lands; at least one discrete component attached to a second portion of the array of lands; and a plurality of non operational, sacrificial components attached to a third portion of the array of lands." The Kelly et al, the Miyazawa, the Hatagishi, and the Sugita et al. references do not teach a sacrificial component. The Sugita et al. reference teaches several fuse configurations. It does not teach the use of a sacrificial component. Furthermore, to yield applicant's invention from the Miyazawa, Hatagishi and Kelly et al. device, requires a modification that destroys the Kelly et al. reference. Namely, substituting a fuse for a ball-shaped connection. The Examiner contends that it would have been obvious to a person of ordinary skill in the art "...to incorporate at least one non operational SC being positioned with respect to the PCB to prevent at least one discrete component from contacting the ground and power places of the PCB as taught by Sugita et al. so that breakage of components can be prevented and electrical performance/reliablity can be improved in Miyazawa, Hatagishi and Kelly et al's device." Applicant disagrees with the Examiner's contention. The teaching in Sugita et al. seems to teach a different type of fuse that is incorporated within a device. In other words, the use of the fuse discussed in Sugita et al. is to prevent the loss of electronic components when current flow becomes excessive. There is no teaching of placing a blown fuse in a circuit. Furthermore, there is no suggestion of incorporating an already blown fuse in a

device, as suggested by the Examiner. In fact, the use of an already blown fuse in the circuits shown, such as those shown in FIGs. 29, 31A, 31B, 32, 33, 34A, and 34B, would destroy the reference, and result in non functioning circuit. This teaches away from the Examiner's contention and is evidence against the modification suggested by the Examiner. As a result, the rejection of claim 21 under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S.5,798,567) and Miyazawa (U.S. 2002/0182842) as applied to claims 1-7 above, and further in view of Hatagaishi (U.S.4,869,972) and Sugita et al. (U.S.5,068,706) is overcome.

Claims 22-27 depend from claim 21 and include the recitations of claim 21 by their dependency. Accordingly, claims 22-27 also overcome the Examiner's rejection.

Claim 34 depends from independent claim 32. Claim 32 recites "...a block of substantially nonconductive material further including: a first major surface; a second major surface; one of the first major surface and the second major surface including: a first solderable surface; and a second solderable surface; and a fuse positioned between the first solderable surface and the second solderable surface." None of the Kelly et al. reference, the Mayazawa reference, and the Hataghishi reference teach or suggest a block of substantially nonconductive material. The Sugita et al. also fails to teach such an element. Accordingly, claim 34, by its dependence on claim 32, overcomes the rejection under 35 USC § 103(a) as being unpatentable over Kelly et al. (U.S.5,798,567) and Miyazawa (U.S. 2002/0182842) as applied to claims 1-7 above, and further in view of Hatagaishi (U.S.4,869,972) and Sugita et al. (U.S.5,068,706) since none of the references teaches or suggests the claim limitation of a block of substantially nonconductive material. Therefore, the combination of the references simply falls short of the claimed elements.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney ((612) 373-6977) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 29th day of July, 2005.

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Name

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